Listing of Claims

The following listing of claims will replace all prior versions, and listings, of claims in the subject application:

1. (currently amended) A magnetic resonance imaging apparatus comprising:

a plurality of receiving coils for receiving a magnetic resonance signal generated from an object to be examined;

sensitivity image data acquiring means for acquiring sensitivity image data by executing a first pulse sequence using the plural receiving coils from a plurality of slice positions separated from each other at intervals on the object;

means for acquiring examination image data of each of the plural receiving coils from the plural slice positions sequentially adjoining on the object by executing a second pulse sequence using the plural receiving coils while a phase encoding matrix in a k space is thinned out; and

artifact removing means for generating sensitivity distribution data of the plural receiving coils on the slice positions of the examination image data on the basis of the plural sensitivity image data and removing an aliasing artifact in the examination image using thus generated sensitivity distribution data of the receiving coils,

wherein an unmeasured sensitivity image of each receiving coil is calculated with a slice interpolation before the sensitivity distribution of each receiving coil is calculated.

2. (original) A magnetic resonance imaging apparatus according to claim 1, wherein the plural receiving coils include a receiving coil having a substantially uniform sensitivity

distribution and a multiple receiving coil having a plurality of receiving coils.

3. (original) A magnetic resonance imaging apparatus according to claim 2, wherein the receiving coil having a substantially uniform sensitivity distribution is a coil which is also used for transmitting an RF pulse.

4. (currently amended) A magnetic resonance imaging apparatus according to claim 1, wherein $n<m$ where the number of slices of sensitivity image data of the plural receiving coils is n and the number of slices of the examination image data is m.

5. (original) A magnetic resonance imaging apparatus according to claim 1, wherein the plural sensitivity image data are acquired with a multi-slice pulse sequence.

6. (original) A magnetic resonance imaging apparatus according to claim 1, wherein the sensitivity image data acquiring means measures an NMR signal of each of the plural receiving coils only in a low-frequency region of the k space having a predetermined phase encoding matrix.

7. (original) A magnetic resonance imaging apparatus according to claim 6, wherein the low-frequency region of the k space measured by the sensitivity image data acquiring means is the central portion in phase encoding direction of the k space and about one-fourth size of the whole phase encode matrix.

8. (original) A magnetic resonance imaging apparatus according to claim 2, wherein the examination image data acquiring means measures the NMR signal while thinning out every N steps in the phase encoding matrix of the k space of each receiving coil, where the number of receiving coils forming the multiple receiving coils is N.

9. (currently amended) A magnetic resonance imaging apparatus according to claim 1, wherein one or more sensitivity ~~distribution data~~ images of the multiple receiving coils corresponding to the slice positions of the examination image which is not yet measured are calculated with an interpolation calculation using the measured sensitivity distribution data.

10. (original) A magnetic resonance imaging apparatus according to claim 2, wherein the sensitivity distribution of each receiving coil of the multiple receiving coils is calculated by dividing the sensitivity image of each receiving coil by the sensitivity image obtained by the receiving coil having a substantially uniform sensitivity distribution.

Claims 11-12 (canceled).

13. (original) A magnetic resonance imaging apparatus according to claim 1, wherein the number of the plural receiving coils is two.

14. (original) A magnetic resonance imaging apparatus according to claim 1, wherein the number of the plural receiving coil is three or more, those receiving coils are combined into a plurality of receiving coil group, and sensitivity distribution data are combined at each

receiving coil group.

15. (currently amended) A magnetic resonance imaging apparatus comprising:

a plurality of receiving coils for receiving an NMR signal generated from an object to be examined;

sensitivity image data acquiring means for acquiring sensitivity image data including an NMR signal of a low-frequency region of a k space with each of the plural receiving coils from a plurality of slice positions separated from each other on the object by executing a first pulse sequence using the receiving coils;

means for acquiring an examination image data with each of the plural receiving coils from the plural slice positions sequentially adjoining on the object by executing a second pulse sequence using the plural receiving coils where a phase encoding matrix of the k space is thinned out;

means for generating a sensitivity image data of each of the plural receiving coils on slice positions of the examination image data with an interpolation on the basis of the plural sensitivity image data and generating a sensitivity distribution of the plural receiving coils from thus generated sensitivity image data of receiving coil and the above plural sensitivity image data;

means for forming a determinant from the sensitivity distribution of the plural receiving coils and the examination image data of each of the receiving coils; and

artifact removing means for removing an aliasing artifact in the examination image by performing an inverse matrix calculation of the determinant,

wherein an unmeasured sensitivity image of each receiving coil is calculated with a

slice interpolation before the sensitivity distribution of each receiving coil is calculated.

16. (currently amended) A magnetic resonance imaging apparatus comprising;

a plurality of receiving coils for receiving a nuclear magnetic resonance signal generated from an object to be examined;

sensitivity image data acquiring means for acquiring sensitivity image data of each of the plural receiving coils on a plurality of slice positions separated from each other on the object by executing a first pulse sequence using the receiving coils;

sensitivity distribution data acquiring means for generating sensitivity image data of a substantially uniform sensitivity distribution by combining the sensitivity image data acquired by the plural receiving coils and calculating sensitivity distribution data of each receiving coil from thus combined sensitivity image data and the sensitivity image data of each receiving coil;

means for acquiring examination image data from the plural slice positions sequentially adjoining on the object by executing a second pulse sequence using the receiving coils while a phase encoding matrix of the k space is thinned out; and

artifact removing means for removing an aliasing artifact in the examination image using the sensitivity distribution data of each receiving coil,

wherein an unmeasured sensitivity image of each receiving coil is calculated with a slice interpolation before the sensitivity distribution of each receiving coil is calculated.

17. (new) A magnetic resonance imaging method comprising:

receiving a magnetic resonance signal generated from an object to be examined;

acquiring sensitivity image data by executing a first pulse sequence using the plural receiving coils from a plurality of slice positions separated from each other at intervals on the object;

acquiring examination image data of each of the plural receiving coils from the plural slice positions sequentially adjoining on the object by executing a second pulse sequence using the plural receiving coils while a phase encoding matrix in a k space is thinned out;

generating sensitivity distribution data of the plural receiving coils on the slice positions of the examination image data on the basis of the plural sensitivity image data and removing an aliasing artifact in the examination image using thus generated sensitivity distribution data of the receiving coils; and

calculating an unmeasured sensitivity image of each receiving coil with a slice interpolation before the sensitivity distribution of each receiving coil is calculated.

18. (new) The method of claim 17, wherein $n<m$ where the number of sensitivity image data of the plural receiving coils is n and the number of the examination image data is m.

19. (new) The method of claim 17, further comprising calculating one or more sensitivity images of the multiple receiving coils corresponding to the slice positions of the examination image which is not yet measured with an interpolation calculation using the measured sensitivity distribution data.